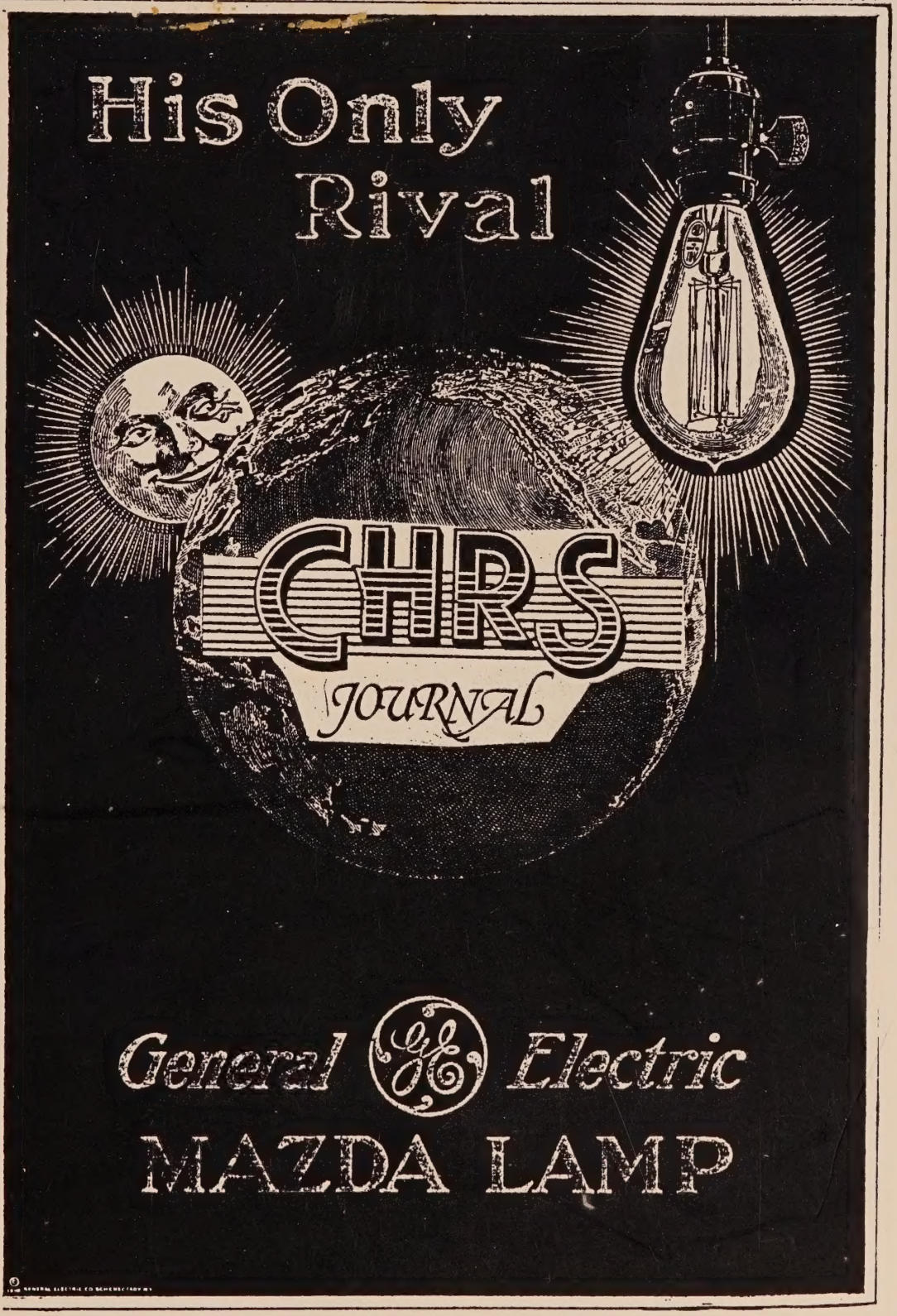
CHRS

CALIFORNIA HISTORICAL RADIO SOCIETY

VOL XI NO II MAY 1987



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The California Historical Radio Society is a non-profit corporation charted in the State of California, and was formed to promote the restoration and preservation of early radio and broadcasting. Our goad is to provide the opportunity to exchange ideas and information on the history of radio, particularly in the West, with emphasis in the areas such as: collecting, literature, programs, and restoration of early equipment. The Journal of the CHRS is published quarterly and is furnished free to members.

President's Message
by Paul Joseph Bourbin

Many of you said that you wanted a printed Journal. Well, here it is. I would like to thank Bill Helander, Doug Martin, Norm Berge and all of you who submitted material for making this Journal possible. There is quite a variety of articles and I am sure that some will be of interest to all of you. More material will be needed for the next Journal which will come out in November if there is enough material. Please submit any articles that you would like to see in print. We depend on support from the membership to make things happen, so please help.

The major portion of this journal was entered into a personal computer on WordStar 3.3 by Bill Helander. Then the text was converted to in DisplayWrite 4 format and uploaded to a large mainframe. The final step was to edit the articles for spelling errors and context checking before submitting to be printed on a laser printer.

I would like to thank those who attended the drop-in at my home on 21 February. A good time was had by all.

The swap-meet/auction/contest of 28 February was quite successful. About twenty-seven sellers attended. A large number for a winter meet. Because of publicity on local television, many new people were seen at the meet. Many new members signed up. The contest winners were as follows: A.C. Table Models: First...Mike Simpson's Climax Second..Doug Ludwig's Zenith

Novelty Sets: First...Ken Zander's Gemtone Second..Don Rathburn's Majestic

Speakers and Microphones: First...Norm Berg's Western Electric Microphone Second..Iodra Mfg. Co. Enhancer Speaker

Homemade sets: First...Len Lansdown's tube transmitter Second..Henry Meyer's Regenerative transmitter Third...Paul Bourbin's Wireless rig

One tube sets: First...Don Iverson's Crosley Pup Second..John Wentzel's Tri City Set

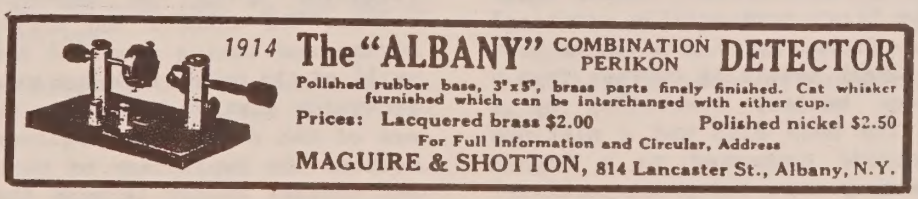
Regenerative sets: First...Jack Gray's HB-1 Short Wave Converters First...Don Iverson's Dresner

Crystal Sets: First...Don Iverson's Stienite Second..Henry Meyer's Westinghouse Third...Henry Meyer's Edison Swan

Many thanks to our three judges: John Wentzel, Will Jensby and Larry Boysen.

The next Swap Meet will be on Saturday 23 May at Foothill College, Los Altos Hills, Ca. from 8:00 to 11:00 AM. Please plan to attend. You should receive your next audio tape "Radio News" at the beginning of August.

Well, that's it for now. If you have any questions, comments or ideas please feel free to call me at (415) 648-8489 or write to me at 25 Greenview Court, San Francisco, Ca. 94131. Thanks.



FROM THE BEGINNING
PART III
by Paul Joseph Bourbin
The End of the Beginning

In the second part of this series, we discussed the development of the crystal detector which made radio practical. There was one problem that yet had to be solved. It was that of amplification. All detectors developed were passive in nature. That is, they just passed on the signal at the same power as received by the aerial. They did nothing to make the signal stronger. This limited the range and usefulness of radio. It also prevented radio from becoming a device found in every home. Most people, except for serious radio hobbyists, did not want to spend the time and trouble to adjust detectors, tuners and coils, they wanted something that they could use without much trouble and they did not want to wear headphones. The answer was amplification.

Edison, in 1882, discovered during his experiments with the electric light that the deposit on the glass of his bulb could be prevented by the insertion of a platinum wire. He noted that a current was produced in the wire even though it was not connected to the filament. He designed a tripolar bulb to demonstrate the effect but never exploited it even though he patented it in 1883. This effect became known as the Edison Effect. Fleming, on seeing a demonstration of the Edison Effect, designed the Flemming Valve. The Flemming Valve, consisting of a filament and plate, performed the same duty as the crystal detectors, that is, rectification. The Flemming Valve was more sensitive, however, yet it still did not amplify the signal. In 1906 Lee De Forest designed the first Audion bulb. It was the first commercially practical radio tube. It consisted of a vacuum bulb with a filament receiving current from a low voltage battery controlled by a rheostat. The bulb also had a platinum wing electrode connected to a higher voltage battery and a telephone receiver. Later versions also used a grid. The oscillations over the gap in the audion produced oscillations in the receiver. It was this grid that allowed amplifications to occur. For the first time, a signal could be heard with greater strength than was received by the aerial. Interestingly enough, the first major user of the audion was the American Telephone and Telegraph Co. Long distance telephone communication was hampered by losses occurring because of resistances in the wire. Their lines from the East Coast could not extend west beyond Denver, Colorado because of these losses. With the audion, transcontinental telephone communication was possible. Since the amplification factor of the audions was rather small, they often had to be "cascaded" that is, the output of one tube would be amplified by the next. Often when this was done a squealing or howling was heard because of feedback or regeneration from one stage to another. De Forest noticed this effect but did not use it. Neither did Marconi whose valve was of a similar design.

During 1912 and early 1913, Edwin H. Armstrong developed the regenerative receiver. He found that by controlling the feedback through a tickler coil, the signals could be made stronger. The signals were strongest just before oscillation. The regenerative receiver had many advantages over what had been used before. It made use of what had been annoyance. Since the detector tube also served as an audio amplifier, one less expensive tube was needed. As more and more stations went on the air, the extra selectivity was appreciated. Wireless telephony was now more practical because its range was greatly extended (it had been hampered because the range of a radio-telephone station was much less than that for a code station of equal power).

However, there were still problems in reception using the regenerative receiver. The squeals and howls were annoying and tuning required considerable skill of the user. Although excellent for receiving distant stations, the receivers of the day did not deliver good fidelity. The amplifiers of that time did not operate evenly through the spectrum of frequencies to which the radio could be tuned. If an amplifier could operate at its ideal frequency (the frequency for which it was designed) then increased fidelity, sensitivity and selectivity

would result. The problem was to devise a way to convert the frequency received at the aerial to one standard frequency for radio frequency amplification. Remember, in part two of this article, that Pickard had succeeded in producing a "beat" note from two oscillating crystals. If two oscillating units are brought in proximity, a resulting oscillation, or beat, is produced which is the difference of the frequencies of the two oscillating units. Various ideas were tried to produce a circuit that would change the received station's frequency to a single frequency that could be amplified efficiently. During World War One, Edwin Armstrong, along with others, in Paris developed the Superhetrodyne Circuit. By combining the received radio frequency with an internally generated radio frequency that was varied to always be exactly the same number of cycles different from the received frequency, a consistent intermediate frequency would be produced. By designing an amplifier to work most efficiently at this particular frequency, a radio could be very selective and sensitive without the problems of the regenerative circuits. World War One ended before the superhetrodyne radio could be used and the circuit remained virtually dormant until the advent of commercial broadcasting. Although the superhetrodyne circuit was quite good, the regenerative circuit remained popular for quite a while. Tubes were quite expensive and the superhetrodyne radio required seven or eight of them while the regenerative sets could be made with one or two. Armstrong sold his patents to RCA and because of high royalties charged, superhetrodynes were very expensive. The superhetrodyne is the circuit that is still in use today for almost all radio applications. Widespread commercial broadcasting was now possible and we have come to the end of the wireless era.

Other uses of radio were implemented or, at least, envisioned before World War One. Picture transmission (known today as "facsimile") was attempted. Typewriting and typesetting by radio were envisioned. Pictures were transmitted by using multiple dots and dashes transmitted for dark lines and dots spaced farther apart for light lines. A revolving cylinder covered with paper and having a soft pencil in contact with it would receive the picture. The two major problems were keeping the two stations in synchronization and eliminating interference. Another early development was the radio compass. Its operation was similar to the modern direction finder. With it ships could establish the direction of other ships. Exact locations of ships could be ascertained by triangulation and navigation was possible by use of land based stations. Train dispatching via wireless with aerials running the full length of railroad cars. Special connections were used to connect aerials from car to car. This was first done by the Marconi Wireless Telegraph Co. on the Lackawanna Railroad. Hugo Gernsback envisioned an anti-aircraft rocket using two electric eyes to guide the rocket by guiding it to the plane's dark silhouette against the sky. Apparently the guidance system could not turn the rocket fast enough to catch the plane. A non-radio form was Major Squire's "Wired Wireless" telephony or telegraphy. Transmissions could be made over long distances along one wire. The system worked if both stations were connected by one single wire. It was used for a duplex telephone system and an attempt to broadcast radio via telephone lines was made but the system proved to be commercially useless.

In these articles, I have tried to show some of the major developments in early wireless telegraphy and telephony. Perhaps they will stimulate an experimenter to re-create some of the early devices. I think that it will make all of us appreciate our post-war equipment a little more.

Hugo Gernsback
Early Prophet of Radio
by Mark E. Gottlieb

Many radio hobbyist with a technical background can tell you immediately about the tremendous importance of the key technical inventions in the history of radio. For example, Marconi's demonstration of wireless communications (1885), and Lee de Forest's triode "audion" (1906) all contributed greatly to the development of modern radio.

Similarly, Edwin Armstrong's discoveries of regenerative feedback (1912), the superhetrodyne principle (1916), super-regeneration (1922) and frequency modulation (1933) probably contributed as much or more to radio than the collected inventions of any other single person. Yet, technically-oriented hobbyist (including myself) can sometimes overlook the very significant -- and even essential -- contributions that some of the more "promoter" type people made to radio.

Ask your technical friends to name five of six important people in radio history and you'll almost always get a list of "technical" people: Edison, Fleming, de Forest, Armstrong, Marconi, maybe Fessenden, and so forth. Few would include Hugo Gernsback on their lists. What did Gernsback contribute? Well, that is a story...

Hugo Gernsback was born in 1885 and came to America from Luxembourg in 1904. He had invented a new type of dry cell battery and soon established a company in New York City to market it together with other wireless supplies and parts. This Electro Importing Company (E.I.Co. for short) including mail- order and the "world's first radio retail store", and it sold the first radio set designed for home consumer use in 1906. It also sold the "electro-audion" tube in 1911, thereby making this useful new radio device available to a wide public.

By 1908, Gernsback's mail-order catalogs had grown to a considerable size, and he began publishing "Modern Electronics" magazine as a natural extension of his business. This magazine featured many radio articles and ads; its very first article was entitled "Wireless Telegraphy". And, while Modern Electrics was published only from 1908 to 1912, it was the first of a succession of Gernsback publications that continue in print to this day.

Some of Gernsback's other titles included Electrical Experimenter/-Science & Invention (1913-1929), Radio Amateur News, Radio News, Radio-TV News, Radio Craft, Radio Electronics, Practical Electrics (1921-1924), Television News (1931-1932), Short Wave Craft (1930-1936), and Radio and Television (1938- 1941). Gernsback's publications have recorded the progress of radio science for almost 80 years.

But Gernsback was more than just a merchant and publisher - he foresaw much of radio's progress and he used his merchandising and publishing activities to actively promote the development of radio and related applications to a mass audience. The importance of this type of synergy between technical invention and the creation of a mass audience or demand for the products of the invention is frequently noted but seldom explicitly stated. We will state it here.

There have been many technically-significant inventions that failed to get developed, or were long delayed in their development, due to insufficient public interest or demand for them. American automobiles got only five to ten miles per gallon until public demand for more efficient vehicles caused their redesign. The technology to produce fuel-efficient cars existed long before they were actually made in any great volume by Detroit; it took a synergy of technical feasibility and public interest or demand to have this done.

Gernsback saw to it that the public became interested in radio. He not only announced new radio developments, he called for them ahead of their achievement, thereby helping spur the new science along.

As early as December 1909, Modern Electronics proposed several methods whereby "Television and the Telephot" could be created. (A "telephot" was Grensback's

vision of what Ma Bell would introduce as the "Picture Phone" in the 1960's.)

In 1909, synchronized scanning systems were not foreseen and Gernsback described arrays of small lights as the picture-forming matrix. The lead article of this Electrical Experimenter magazine for May, 1918, again predicted the regular consumer use of television and the "telephot". As Gernsback said in his article: "There are certain inventions which, although not as yet existent, we may take for granted will be invented some day without any doubt whatsoever...". He then proceeded to describe in considerable detail what a picture phone system would have to consist of including a better concept of the actual future course of the technology.

Gernsback predicted the development of radar, the application of radio signals to determine the locations of distant objects (such as air planes); he did this in April, 1911 Modern Electrics. And, in a similarly visionary vein, he predicted the day of 500 mile-per-hour "Electro-Flyer" trains. Correctly minimizing frictional drag, Gernsback's March 1917 article recommended magnetic leviation (Mag-Lev) propulsion. Such trains are now being built overseas, with a route being proposed also between Los Angles and Las Vegas. And, while these trains only run at about half of Gernsback's 500 mph, they could be built to run faster, and the public is clearly interested in these speedy transport systems.

Gernsback described the future of radio reproduction of high- fidelity musical programs, with loudspeaker or room volume reception, in his January 1919 Electrical experimenter; such performance was at least several years off but Gernsback's write-up served to point the way. By June, 1920, he was describing how remote objects like torpedoes and small craft could be controlled by radio signals from afar, and he predicted the expansion of such "remote control" technology to other applications. His November 1924 Experimenter envisioned a pilot-less "radio television plane" for military purposes; a "drone" in the modern parlance, entirely controlled by remote radio signals (and guided by television images). This technology is now an integral part of air force intelligence gathering operations.

In December 1923, Gernsback advocated "single-knob" control of radio receivers, which were then mostly of the "three-dialer" tuned radio frequency design with separate tuning required for each stage of the circuit. Single-knob controls became widely available within the next couple of years, as with the Atwater Kent Model 30 and other sets using "ganged" tuners of various types. By February 1927, Gernsback was proposing that radio signals be bounced off the moon, something that took another 19 years to achieve. A later (1958) Proceeding of the IRE article credited Gernsback's 1927 proposal as having been "the first serious proposal to send signals to other heavenly bodies and return".

Gernsback's magazines ran contests to encourage more distant radio communications and the exploitation of new techniques. He predicted, described, and popularized new developments and applications of radio technology in modern life. The reader was encouraged to participate, experiment, and contribute to making radio more than it already was.

The power that the mass imagination plays in the development of society in immense. Astronauts were sent to the moon largely due to President Kennedy's electrifying speech launching the Apollo program in the public mind. No such massive investment of capital, technology, and physical resources could have succeeded without the widely-held public support for this program. It is also likely that many of the significant technical innovations in the history of radio would not have enjoyed as quick a success, or as complete a success, as they did, without Gernsback's steady stream of imaginative predictions and promotion of the new radio science to his large audience of readers.

Perhaps Hugo Gernsback doesn't quite warrant being placed on a short list of three or four radio pioneers; the more technical men may properly fill that list. But, it is submitted, he most definitely deserves inclusion on any list

of the "Top Ten". For further information, refer to any early Gernsback publication, or to the April 1958 "Anniversary Issue" of Radio Electronics (from which much of the information in this article came) for a more complete history of Hugo Gernsback and his role in our radio hobby.

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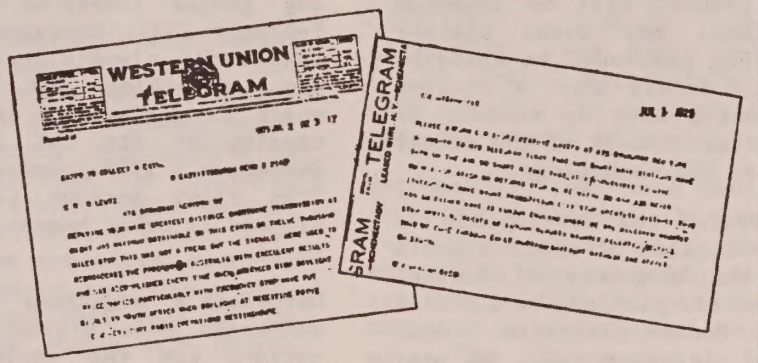

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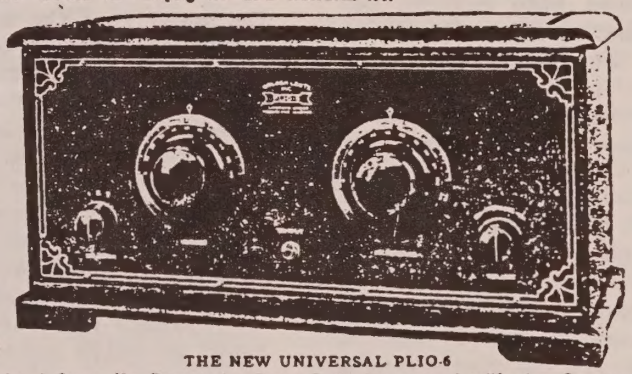

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Partial CONTENTS OF APRIL ISSUE:

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By Robert F. Gowen

The Resonant Converter Transmitter

New Facts About Nauen Station
By Dr. Alfred Gradenwitz

Wireless in Modern Aircraft
By Alexis J. Hall

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A LITTLE-KNOWN WIRELESS STATION
by Paul Joseph Bourbin

In July 1913, a British-German corporation, Universal Radio Syndicate Ltd., purchased 54 acres of land in Newcastle, New Brunswick, Canada for the erection of a wireless station for trans-atlantic use. A sister station was to be erected at Ballybunion, Ireland. On the Canadian side, the messages were to be forwarded via the lines of the Great North Western Telegraph Co. The Universal Radio Syndicate intended to have world-wide coverage similar to that of the Marconi Co. Although the company's main office was in London, the German shareholders seem to be in the majority as further developments will show.

The location found by civil engineer William E. Fish was ideal for a wireless station. There were no obstructions between the station and the sea and the station had railroad access. The station had one 500 foot high tower of steel that remained as a prominent landmark in the area well into the thirties. Around the large tower were six wooden towers either 100 or 300 feet high, depending upon which source you believe. Universal Radio Syndicate had purchased the patent rights and control of the Poulsan Wireless Telegraph System and used that system in all of its stations. The construction work was tended to by Danes and Sweeds who were familiar with the Poulson system and from three to seven Germans. Indians from Quebec were hired to do the high iron work and were good when they worked. The problem was that they often were drunk on "firewater" and were in no condition to work. When they started dancing on the platform at the top of the tower, they were fired. The station was as powerful as any then in existence. It required two Diesel engines with fourteen foot flywheels and 250 horsepower to operate the two dynamos that powered the station. The station was completed early in 1914.

The station was still being tested and used for experimental work when World War One broke out. A receiving system using rolls of photosensitive paper, similar to photographic film, to record the dots and dashes was being tried there. One could not read the message until the roll was developed. This system was probably tried to increase speed of reception, give a permanent record of what was received and to give some measure of privacy. At any rate, the station was not put into commercial operation when the war broke out. Since that station was partly owned by people of an enemy country, the Canadian Army sent 200 soldiers to seize the station at bayonet point. The Germans were incarcerated but later the two officers were paroled. They escaped Canada and went to South America and thence to Germany. The station was then used by the Canadians and British for Trans- Atlantic work as well as listening to German transmissions. All of the transmissions were in code. The operators had no idea of what the strings of numbers meant. A garrison of 50-70 was stationed there for the entire war. The area around the station was also used as a recruiting and training station. This station was one of the most important stations for the Admiralty during the war. Messages were transmitted and received day and night and the received messages were made into nine copies and sent to various military centers and naval bases. Listening in on German stations was based upon agent's reports of important transmissions from Germany. Then intelligence experts would listen to the German code and try to decipher it, knowing that many Allied lives held in the balance.

After the War, in 1919, the station was acquired by the Marconi Telegraph Company of Canada. Limited from the Universal Radio Syndicate which went into liquidation. Briefly after the war, the station was used for experimental purposes and then abandoned as its equipment was obsolete and would require $250,000 to restore.

Charles Lund, who was with the station from the beginning, stayed with the station as caretaker. Although the station housed thousands of dollars of equipment, it was never used again. Occasionally Mr. Lund would start the one functional Diesel engine, but that was the only activity at the outpost. In 1935, the six wooden towers were condemned and taken down. The large steel tower and the

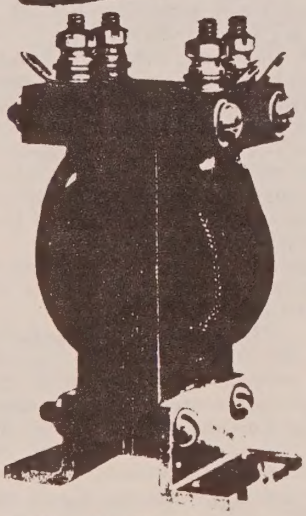
crumbling ruins of the barracks and transmitter were all that remained as reminders of the great station. Surrounding the transmitter building was the death- stench of chemicals emanating from the darkroom used for the developing of messages. The Marconi Company continued to own the station as late as 1937.

I would like to thank member E. Burnes Getchell, VE1CL, for sending me the copies of contemporary articles dealing with the Newcastle station.

BIBLIOGRAPHY

New Brunswick telegraph Journal, 1937
The North Shore Leader, 1935
The North Shore leader, July 11, 1913
Miramichi-Leader, May 2, 1984

Federal Standard Radio Accessories



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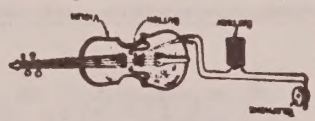

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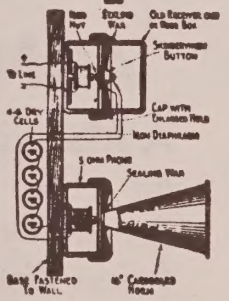
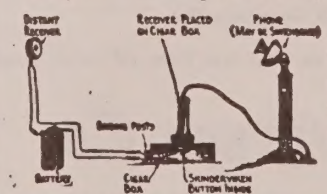


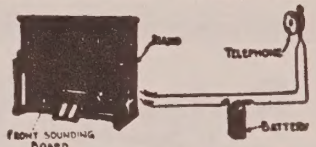
Full directions for connecting up the button for use as a detectophone are given in booklet which is sent with each button.

The only instruments needed to complete a detectophone outfit, in addition to a Skinderviken Transmitter Button are a receiver, battery, and, if desired, an induction coil.



AMONG electrical experimenters the button has created a sensation. It is not uncommon to receive unsolicited letters like these: "I received transmitter button today and I wish to inform you that it works great and is *the best I have ever seen or heard of for the price.* I will certainly recommend it to my friends. I wish to thank you for your good service."

"I have been using one of these transmitter buttons, and it has proved to be worth more than its value in my experimenting." "I received one (Transmitter Button) some time ago, and they are just O. K. for experimenting." "I have been using one of these transmitter buttons for experimental work and it certainly lives up to all you say for it *and then some.*"

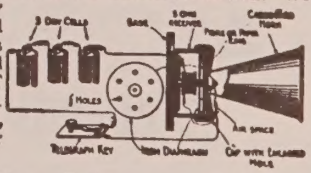


Mr. H. Gernsback, editor of this magazine, who is the dean of electrical experimenters, said: "In the writer's opinion, obtained by actual elaborate tests, the Skinderviken Transmitter Button is probably the most efficient device of its kind on market today, due to its simplicity and other outstanding features. Should have a great future."

The same circuit connections apply to all experiments, regardless of how the transmitter button is mounted.

The Skinderviken Transmitter Button operates on one or two dry cells. It often happens that two cells produce too much current and the sounds are deafening. We recommend either one fresh cell or two worn out cells.

We have the utmost faith in this transmitter button. We guarantee satisfactory service or we will refund the purchase price. Boys—Young and old—send in a dollar bill RIGHT NOW! You can't lose. If you're not satisfied, you receive your dollar back. Isn't that fair?



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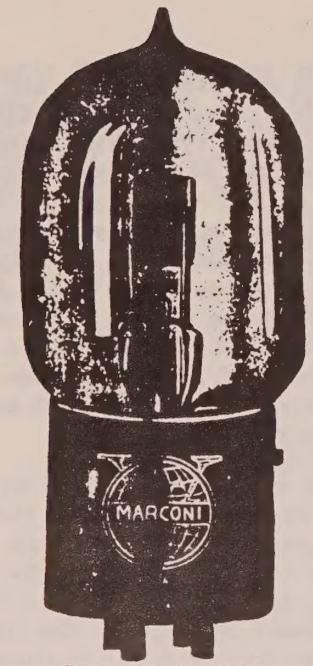
Name .....

Address .....City .....State.....



Fleming Pat. No. 803684
De Forest Pat. Nos. 841387-879532

A WARNING

to Manufacturers
Importers
Dealers
Jobbers
Agents
Amateurs
Purchasers
Users of

Vacuum Tubes

The Marconi V. T. Patent is Basic

United States Letters Patent to Fleming, No. 803,684, November 7, 1905, has been held to be valid by Judge Mayer of the United States District Court for the Southern District of New York, and by the United States Circuit Court of Appeals for the Second Circuit.

It is a basic patent and controls broadly all vacuum tubes used as detectors, amplifiers or oscillions in radio work.

No one is authorized to make, sell, import or use such tubes for radio purposes, other than the owners of the patent and licensees thereunder. Any others making, selling, importing or using them alone or in combination with other devices, infringe upon the Fleming patent and are liable to a suit for injunction, damages and profits. And they will be prosecuted.

THE AUDIOTRON AND THE LIBERTY VALVE ARE NOT LICENSED UNDER THE FLEMING PATENT

The price of the genuine Marconi V. T. delivered is $7.00 each. The standardized socket is $1.50 additional. The standard resistance, complete, costs $1.00 and is made in the following sizes: ½ megohm, 1 megohm, 2 megohms, 4 megohms, 6 megohms.

Do not take chances by making, importing, selling, purchasing or using vacuum tubes for radio purposes not licensed under the Fleming patent. By selling, purchasing or using licensed tubes for radio purposes you secure protection under the Fleming patent and avoid the risk of litigation for infringement thereof.

This warning is given so that the trade and public may know the facts and be governed accordingly.

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301 Commercial Bank Annex, New Orleans, La.
109 South 2nd St., Philadelphia, Pa.

ZENITH CHASSIS IDENTIFICATION
by Stan Lopes

There are many collectors of Zenith radios and other collectors who include one or two in their showroom. Many Zeniths appear in ads for sale or at Swap Meets, so with a brief description or a thorough look, how is the collector to know what he is contemplating spending his hard-earned (?) dollar for? This article will show you how to better identify that possible addition to keep you from ending up with a radio you really don't want, like perhaps a 32 volt Farm radio.

Prior to 1936 the marking used to identify Zenith radios was by arbitrarily assigned numerical designations. Then in 1936 a new system appeared using three separate units to each designation: 1st a number, 2nd a letter(s) and 3rd another number. The first unit, the number, was assigned to designate the number of vacuum tubes used in the set; the 2nd unit is a letter (or letters) indicating the type of service for which the set was designed; and the 3rd and final number was provided to identify the cabinet used. Examples will be shown. The 2nd unit, a letter was assigned as follows:

A --- straight AC. All wave.
B --- 6 Volt Battery. Farm.
D --- 110 Volt AC/DC.
F --- 2 Volt. Farm.
G --- Portable Pack (Battery), and 110 Volt AC/DC.
H --- Straight 110 Volt AC. Frequency Modulation.
J --- 6 Volt Battery. 110 Volt AC.
K --- Battery Pack, Farm and Portable.
L --- Long and Standard Wave.
M --- Auto Set (2nd letter designates car built for).
P --- Straight 110 Volt AC. Police and Standard Wave.
R --- AC/DC (Chassis w/60 cycle Phono) Broadcast only.
S --- Straight 110 Volt AC. Broadcast and Short Wave.
T --- Straight 110 Volt AC.
U --- Straight 110 Volt AC. Broadcast, Ultra Short and Shortwave.
X --- 32 Volt Farm.

As examples of this system, consider Model 5-D-610, which is a 5 tube radio designed to be operated on (D) 110 Volt AC or DC power lines, while the 610 indicates the cabinet type which does not really interest the service man. Thus we are speaking of a 5 tube AC/DC radio. A Model 1-H-697 can be quickly identified as a 14 tube set 110 Volt AC only receiver with a Frequency Modulation band. Again the last three digits - 697 would identify the cabinet. Cabinets were numbered by years, i.e., 300 line was used in 1939, 400 services in 1940, 500 series in 1941 and so on.

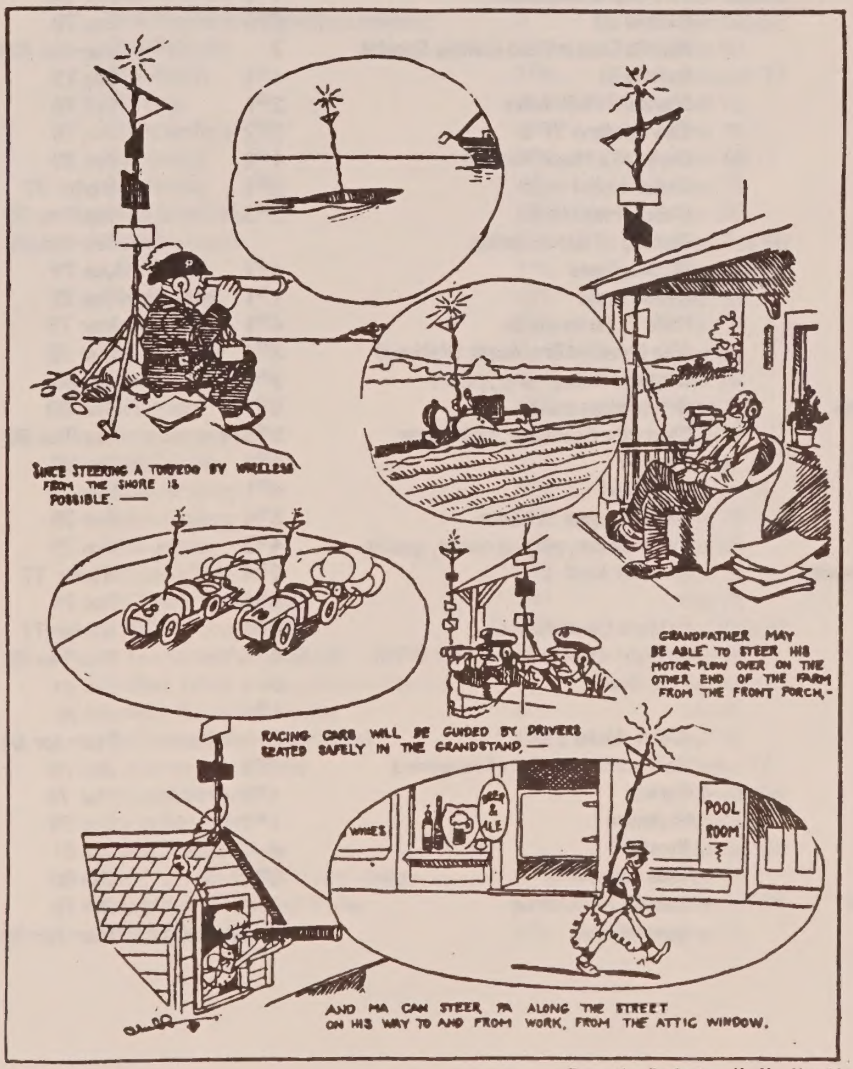
A suffix group of letters is used on some models, usually indicating that the set has some slight variation from the original model although basically the sets are the same. An example would be Model 5-D-610 and Model 5-D-610TB: the latter set would be an export model designed to work on all voltages at 50-60 cycles while the original set was designed to be used on AC/DC 110 Volts as found in the United States. The letter "T" added indicated that set is an export model. Exports sometimes have another letter "A" or "B" added to show 25 cycle all voltage type and 50-60 cycle all voltage type respectively. "C" designates a 50-60 cycle, 95, 117 or 150 volt type. As shown in the above table, automobile radios usually have two letters in the 2nd unit, the second of which designates the make of car for which intended, e.g., the 7ML592 breaks down as a 7 tube car radio to fit into the dash of a Lincoln.

So whether its at a Swap Meet, or in some collectors flyer of items he is selling, you have guide -lines to determine something about a Zenith radio you perhaps didn't realize before. Therefore, if some con artist tries to sell you a Zenith and depicts it as the set used on the Waltons (incidentally a collectors item to some) and he/she tells you it is a 10-S-160 BEWARE!!! as the "experts" say it was a 12 tube (table model - tombstone) which appeared in several scenes, such as when FDR was announcing the declaration of war after that "Day of Infamy". I won't tell you the correct Model number- that's my secret!!!! But you can bet the first digits are 12, not 10....

Repair Hint: Whenever repairing or restoring any tube type radio, be sure to test the grid (G1) voltage on any audio tubes fed by a coupling capacitor. In no case, with rare exceptions, should you find a positive voltage nor a voltage lower by far than the supplied bias as that indicates either a leaking coupling capacitor or a defect in the bias supply system. Experience has shown that bout 75% of the radios I have repaired require the replacement of the coupling capacitor(s) - many times the result is audio distortion but often the leakage is such that distortion has yet to appear. Additionally, over a period of time the audio will be weakened and fail because of the heavy load imposed by the additional tube current caused by this positive grid voltage.

WHAT MAY BE EXPECTED

A CARTOONIST'S IDEA OF
WIRELESS IN DAYS TO COME



From the Rochester, N. Y., Herald.

CHRS 10 year index

category	title	volume	date
Broadcasting	California stations in 1927	1*2	Dec 75
	KPO	2*1	Fall 76
	KQW	1*1	Sept 75
	KYA	1*2	Dec 75
Featured Set	"Japanese" Crystal Set	3*1	Mar 78
	A-K Model 10	1*1	Sep 75
	A-K Model 20 compact	3*3	Oct 78
	A-K Model 5	4*2	Jun 79
	Clearview Six	1*4	Jul 76
	Crosley 50	2*3	Summer 77
	Crosley Trirdyn 3R3	4*3	Sep 79
	Cutting & Washington Model 15	6	Dec 81
	Grebe MU-1	5*1	Mar 80
	Kennedy 220, 221, 250	7	Jan-Dec 82
	Kennedy V Console	2*2	Winter 76
	Marconi 106D	5*2	Jun 80
	Marconiphone V2 Reflex Receiver	7	Jan-Dec 82
	Metrodyne SingleDial	1*3	Mar 76
	Radiola 20	3*4	Dec 78
	Radiola Concert and Radiola Special	7	Jan-Dec 82
	Radiola III	4*4	Dec 79
	Standard Multivalve	2*1	Fall 76
	Thermiodyne TF-6	3*2	Jun 78
	Uncle Al's Magic Voice 5	1*2	Dec 75
	Victor Model 9-25	2*4	Winter 77
	Walker Multi Unit	5*3/4	Sep/Dec 80
History	History of Broadcasting		Sep-Oct 84
	NC Seaplanes	4*2	Jun 79
	Nikola Tesla	1*1	Sep 75
	Philo T. Farnsworth	4*1	Mar 79
	Who Invented Broadcast Stations?	3*1	Mar 78
	Wireless Telegraphy, part 1	9*6	Jun 85
Novelty Nook	A-K playing cards	5*1	Mar 80
	Cigarette Container, Gas Gauge	5*3/4	Sep/Dec 80
	Puzzles	5*2	Jun 80
	Radio Owl	4*1	Mar 79
	Radio Recipes, Ribbons	3*4	Dec 78
	Radio-banks, playing cards, games	4*2	Jun 79
Radio Companies	Atwater Kent	2*4	Winter 77
		4*4	Dec 79
	Baldwin (headphones)	2*4	Winter 77
	British- Thompson-Houston (BTH)	5*3/4	Sep/Dec 80
	E. H. Scott	6	Dec 81
		1*4	Jul 76
	FADA, history of	Newsletter	Mar-Apr 84
	Hallicrafters index of receivers	3*2	Jun 78
	Parkin	1*3	Mar 76
	Philmore	1*2	Dec 75
	Remler	6	Dec 81
	Rola (speakers)	5*2	Jun 80
Restoration	Cabinet Refinishing	3*3	Oct 78
	general hints	Newsletter	Mar-Apr 84

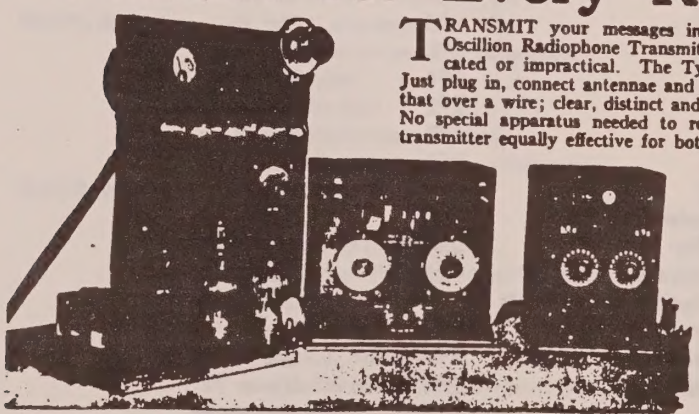
CHRS 10 year index

category	title	volume	date
Restoration	general hints	5*3/4	Sep/Dec 80
		Newsletter	Sep-Oct 83
			Sep-Oct 84
		7	Jan-Dec 82
		6	Dec 81
		Newsletter	Jan-Feb 84
	headphone tips	4*3	Sep 79
	Majestic "B" eliminator	2*3	Summer 77
	Majestic 20 series	4*1	Mar 79
	Nickle Plating	1*3	Mar 76
	Philco	3*1	Mar 78
	repairing magnetic cone speakers	1*2	Dec 75
	Testing Capacitors		Sep-Oct 84
	the A-K 40	2*1	Fall 76
	Using Discretion in Alignment		Jul-Aug 84
	Voltage Measurements		Jul-Aug 84
Speaker	Horn Speakers	4*1	Mar 79
	Radiola horns	5*3/4	Sep/Dec 80
	That Wonderful Radio Horn Speaker	7	Jan-Dec 82
Spotlight Collector	Alan Patmore	5*2	Jun 80
	Alan Smith	2*3	Summer 77
	Bill Pugh	2*1	Fall 76
	Bill Wakefield	3*4	Dec 78
	Bob Avery	5*1	Mar 80
	Bob Herbig	4*4	Dec 79
	Dave Brodie	3*3	Oct 78
	Dave McKenzie	5*3/4	Sep/Dec 80
	Jim Cirner	1*1	Sept 75
	Jim England	4*1	Mar 79
	Joe Horvath	3*1	Mar 78
	John Eckland	6	Dec 81
	Lane Upton	1*4	Jul 76
	Mel Prater	1*3	Mar 76
	Norm Berge	1*2	Dec 75
	Paul Giganti	2*4	Winter 77
	Peter Brickey	2*2	Winter 76
	Ralph Muchow	4*3	Sep 79
	Will Jensby	9*6	Jun 85
	Woody Wilson	3*2	Jun 78
Technical	"A" battery eliminator	2*1	Fall 76
	1932 CW Transmitter	5*3/4	Sep/Dec 80
	A two circuit crystal set	4*2	Jun 79
	Ballast Tubes and Resistance Line Cords		Jan-Mar 85
	build a three-tube reflex	6	Dec 81
	Building a Spark Transmitter	3*4	Dec 78
	Carborundum in Radio	2*4	Winter 77
	Crystal Detectors		Jul-Aug 84
	Early Detectors		Jul-Aug 84
	Early Transmitters		Sep-Oct 84
	How to make Basketweave Coils	5*1	Mar 80
	Long Wave Broadcast Radio		Sep-Oct 84
	Nernst Glower	4*3	Sep 79

CHRS 10 year index

category	title	volume	date
Technical	Regulated "B" supply	3*2	Jun 78
	resistor line cords	3*3	Oct 78
	Small Grid Bias Cells	3*4	Dec 78
	Spark Transmitters		Jul-Aug 84
	Super Selective Tuner or Crystal Set	6	Dec 81
	The Regenerative Detector	9*6	Jun 85
	The Regenerative Receiver	9*6	Jun 85
	The Superheterodyne Receiver		Jan-Mar 85
Tube Column	'99	3*4	Dec 78
	A-P Solenoid Tube	5*2	Jun 80
	DeForest 500-watt power tube	2*4	Winter 77
	Fleming Valve	4*1	Mar 79
	Geissler Tube	5*3/4	Sep/Dec 80
	German MS1 & MS2	3*2	Jun 78
	H & K Gammatron	3*1	Mar 78
	McCullough-Kellogg AC tubes	3*3	Oct 78
	Rejuvination	1*4	Jul 76
	SPEED Triple-Twin	2*3	Summer 77
	The Myers Tube	5*1	Mar 80
	The New Magnavox Tube	4*4	Dec 79
	Update of "Radio" All-Purpose Tubes	4*2	Jun 79
	VT-5	1*2	Dec 75
	WD-11	1*1	Sep 75
	Wunderlich Detector Tubes		Jul-Aug 84
	X-Ray Tubes	6	Dec 81

A Wireless Telephone Now Possible for Every Radio Amateur!



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Type "O," "A. C." Oscillion Transmitter for Radio Telephone and Telegraph (left); Type 00 Multiwave Tuner (center), and Type P-300 Combination Audion-Ultraudion Detector and -Step Amplifier (right). This outfit comprises a complete Radio Telephone-Telegraph Station both transmission and reception. The instruments may be purchased separately. Send for catalogue and get complete details.

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MECHANICAL TELEVISION
by Peter F. Yanczer

Television first came into the public eye in the middle to late 1920's and early 1930's. In the beginning, television was a novelty and provided very little information or entertainment value as we know them today. Despite this, television became very popular. It has been estimated that over 500,000 receivers were built or bought during the "first" television boom. Receivers for the home provided pictures with 24 and later, 48 or 60 lines, one to three inches square and reddish or orange in color. When sound was provided, it was inserted between periods of picture transmission or simulcast on another frequency.

Many of the receivers were constructed by experimenters. Some built kits and others worked from information printed in various technical magazines of the time. Quite often, they would use motors from old fans or appliances, which provided no means for synchronization. Only by careful and continuous adjustment of a rheostat or brake, could synchronism be achieved and then never for more than a "blink of an eye". With these crude receivers, reception of any form of recognizable image was a tremendous accomplishment. Many times, people wrote in to the station, just to say that they saw an image.

The receivers were extremely simple. the major parts were the scanning disk, motor television neon lamp and a means to vary the speed of the motor or disk. The lamp was connected to the output of an associated radio receiver or a special three or four tube television amplifier, connected to the receiver. Options included a magnifying lens and cabinet.

The standard formats were 24 lines, 7.5 pictures per second, (yes, the flicker was terrible) 48 lines, 15 pictures per second and 60 lines, 20 pictures per second. In the Chicago area, one of the stations used the Sanabria standard of 45 lines, 15 pictures per second with each picture made up of three interlaced fields of 15 lines each. The most well known commercial receiver using this format was the "Western" brand.

To illustrate the kind of picture that was available with the 48 line system. Take a piece of cardboard or opaque paper, approximately 8" by 11" and cut a 1.5" square opening in the center of it. Place this on any part of the face of the CRT on your 25" color set and what you see in the opening is approximately what you would see on a mechanical system. An even closer approximation can be had by placing some sort of red filter over the opening, or if you are familiar with color system turn up the red gun.

Mechanical television receivers are just as easy to build today as they were 60 years ago. For the constructor, the hobby has a unique set of requirements in the form of model engineering, electronics and optics. For those who are interested, the necessary information is readily available.

However, there is a problem if you want the receiver to actually operate since there are no transmitters sending out the appropriate television signal. Therefore, it is necessary to develop your own television signal. This is not as difficult as it may seem because a mechanical television camera is not very different from a receiver. In fact, there are ways to use the same disc and motor for both the camera and the receiver. This technique can also be used to provide a video monitor function at the camera location.

If you are a tape enthusiast, it is possible to tape record the signals on reel to reel or modified cassette tape machines. This has been most successful with systems operating on the 24 or 32 line standard. Stereo recorders offer the possibility of using the second track to provide synchronized sound to accompany the picture. Several experimenters are sending tapes back and forth through the mails, exchanging messages and images.

Ham radio operators can also transmit and receive these television signals. It offers the chance of entering the field of ham TV at minimum expense. Bandwidth requirements are modest, being about 3 times (24 line format) or 6 times (48 line format), the bandwidth required by a voice channel. Standard techniques can be used to reduce these values by one half. For those who have no interest in

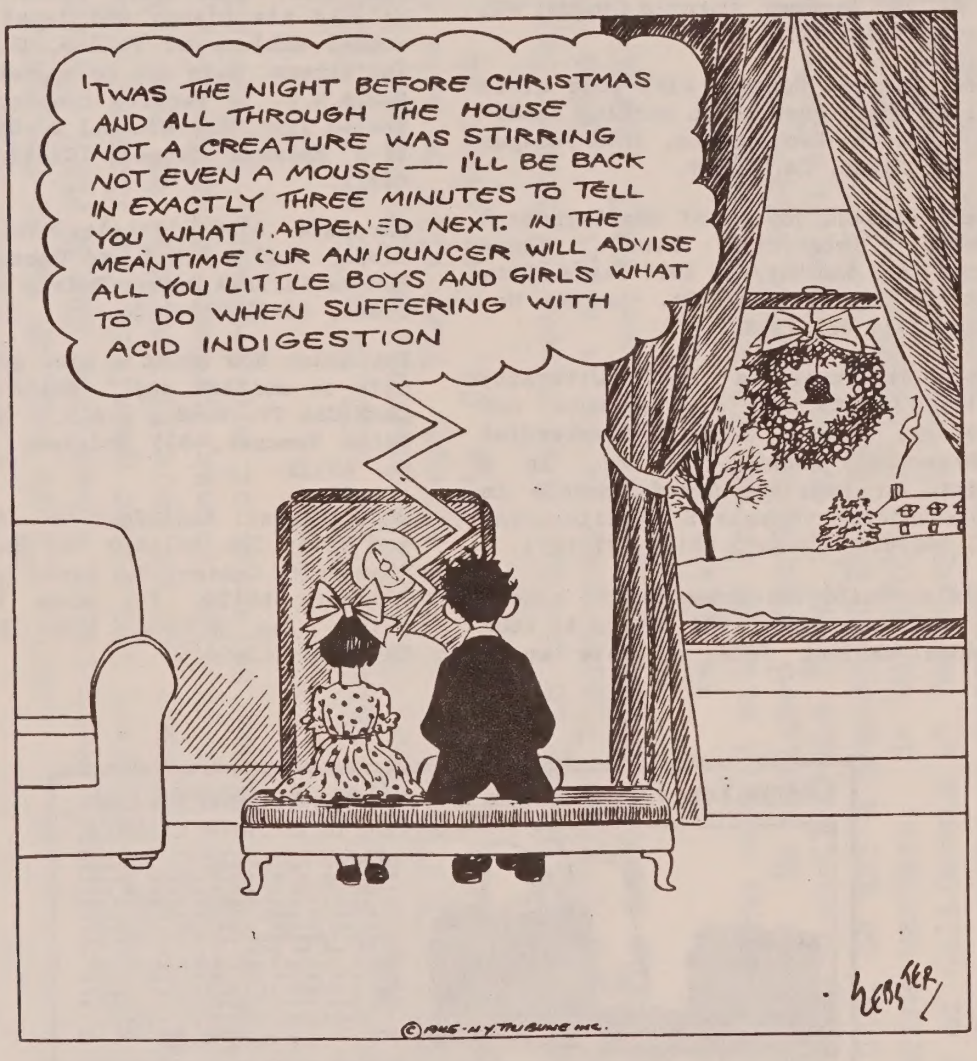
recording or transmission, there is the option of closed circuit operation by which the signals are sent along a wire to the receiver. Because of the unrestricted bandwidth, the images can be superior quality.

Radio collectors with displays of equipment in their homes, can enhance their demonstrations dramatically by adding an operating mechanical receiver to the display. Because of the rarity and cost of actual vintage television equipment, it is not practical or possible for the average collector to acquire a set for his collection. What the collector can do is to construct the equipment much like the experimenter did in the early years. He can fabricate or purchase the parts as he sees fit and the completed set can have all qualities and appearance of vintage equipment. This is particularly true if a period style cabinet is used.

Additional information on this interesting facet or our hobby is available in the following books:

"The Mechanics of Television" by Peter Yanczer (1987)

"Taylorvision" by Edmund E. Taylor (1984).



WANT ADS

Wanted: Working microphone for Webster-Chicago Wire-recorder. Rider's Vols III, VII, X, XI, XII, XIV. Paul Joseph Bourbin 25 Greenview Ct. San Francisco, Ca. 94131.

Wanted: Crosley 58 Cabinet; TechTronics series 500 O'scope; Signal Generator down to 175 KHz; 1629 Tuning Eye tube; some tubes to trade. Patrick Coyle, 533a Balboa, San Francisco, Ca. 94118, 898-1556 (O), 668-5280 (H).

Wanted: Cabinet only. For a Philco model 70 or similar. Cathedral Radio same design as picture on front. Glen S. Lee, R.R. #2, Mt. Brydges, Ontario Canada, NOL 1WO, (519) 264-9115.

Wanted: RCA-103 Speaker with poor cloth grill or none. Must be in working condition. Contact- Ken Eriksen, 1049 Felspar #33, San Diego, Ca. 92109.

Wanted: Various copies of the Gernsback Magazine "Television News". These started with the Mar/Apr 1931 Issue. Pete Yanczer, 835 Bricken, St. Louis, Mo. 63122. (314) 822-1748.

Trade: Hallicrafters Dual Diversity Model DD-1 with near mint console, not operating, for Scott Pointerdial Philharmonic, working or not, in a Lauriate or Lauriate Grand console in good condition. Norman S. Braithwaite, (916) 246-4209 (home), (916) 221-1611.

For Sale: Guild Telephone Radio, excellent condition $150; 1933 Philco 11 tube cathedral-cabinet fair, chassis works good, big set; will make custom radio dials for all sets; have parts or complete cabinets for Philco Mdl 70B and 90B; 1931 Edison console dual chassis-arturus tubes, Mdl R-6 or R-7 $200; 1938 Zenith table with 4 knobs and gold dial $40; 1930's Arcadia Battery superhet unusual cabinet $75; need chassis for: Atwater Kent Mdl 84: Zenith magnifying dial console; Brunswick 1 knob with concentric tuning and Philco Mdls 70 or 90. Bob Malin 5607 Drysdale Dr., San Jose, Ca. 95124, (408) 267-1396. PLEASE NOTE: the number given in the last issue of the "Radio News" was incorrect. This is the proper telephone number.

For Sale: Beautiful, colorful, radio-related tie clasps and lapel pins, all enamel emblems of Philco, G.E., R.C.A. and others. Must see to appreciate. Send L.S.A.S.E. to receive completely illustrated list. Mr. Michael S. Sabodish Sr. 11-A Matawan Avenue, Cliffwood, N.J. 07721.

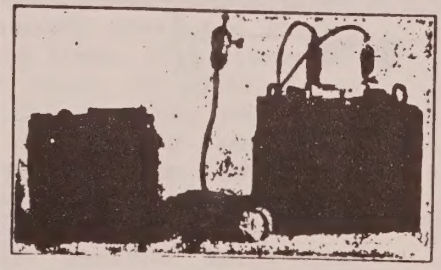
For Sale: 6500 old television and radio tubes, send S.A.S.E. to George Dadakis, 200 Macfarlane Drive, Delray Beach, Fla. 33444, (305) 278-2424.

For Sale: How about a nice gift for the wife on mothers day. Build her a MECHANICAL TV. Send a S.A.S.E. for info to Peter Yanczer, 835 Bricken, St. Louis, Mo. 63122.

Announcement: Radiofest '87. August 14th and 15th. The Holiday Inn Holidome and Convention Center, 345 River Road, Elgin, Illinois 60120. For more information write: Joe Willis, P.O. Box 14732, Chicago, IL 60614.

Charge Your Own Batteries With a Union Rectifier for Only

10c. to 12c. PER CHARGE



Get a Union Rectifier to charge your filament battery and Magnavox battery and your station will operate at the highest efficiency. Connect rectifier plug to 110 volt 60 cycle A. C. lighting socket and connect clips to battery and turn on current at socket. The ammeter on rectifier shows the current flowing and the rectifier operates automatically and with a little care should last for years.

Type A. Rectifier 6 volts, 5 to 8 amperes, complete with ammeter and battery clips....$20.00

Type B. Rectifier, 12 volts, 8 amperes, complete with ammeter and battery clips.....$27.00

Descriptive bulletin on request.

Order one of these rectifiers today and keep your batteries charged.

UNION RECTIFIER COMPANY
MONROE, N. C.

NOTICE PUT BY CALENDAR***PLEASE ATTEND ***NOTICE***

The remaining Swap-meets for 1987 will be held at Foothill College on Saturdays: 23 May, 22 August & 21 Nov. A SPECIAL SWAP-MEET will be held at Bob Gardener's place in Redding,CA at 9:00 AM on 10 October. All members are encourage to attend, especially those from the North. In addition, Bob has a lake stocked with Trout and other gamefish for fishing after the meet. If you plan to attend, please let me know if you will be just buying or buying and selling so that we may be able to make proper arrangements. Since swap-meets seem to be the primary interest of most members, please show your interest by attending.

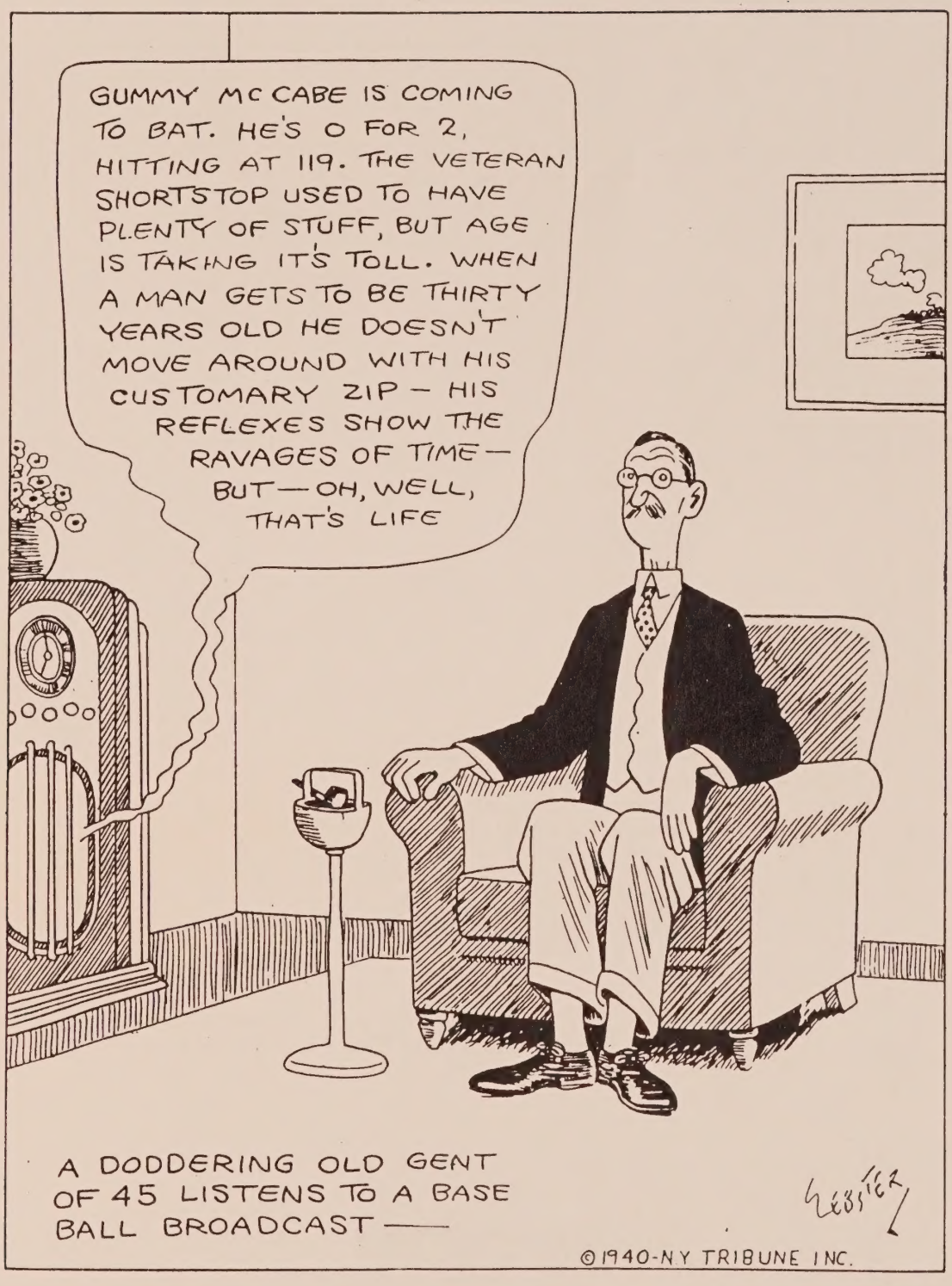
The remaining meetings of CHRS for 1987 will be held on the following Wednesdays: 27 MAy, 24 June, 29 July,26 August, 30 September, 28 October and25 November. All members should attend. They will be held at John Eckland's home, 969 Addison St. Palo Alto, CA. They start at 7:30 PM.

CHRS will be participating in the San JOse Museam's Pioneer Days on Saturday and Sunday, 16 & 17 May. Please come by for a visit. Anyone interested in participating for a few hours, please call me, Paul Bourbin.

** Silent Key**

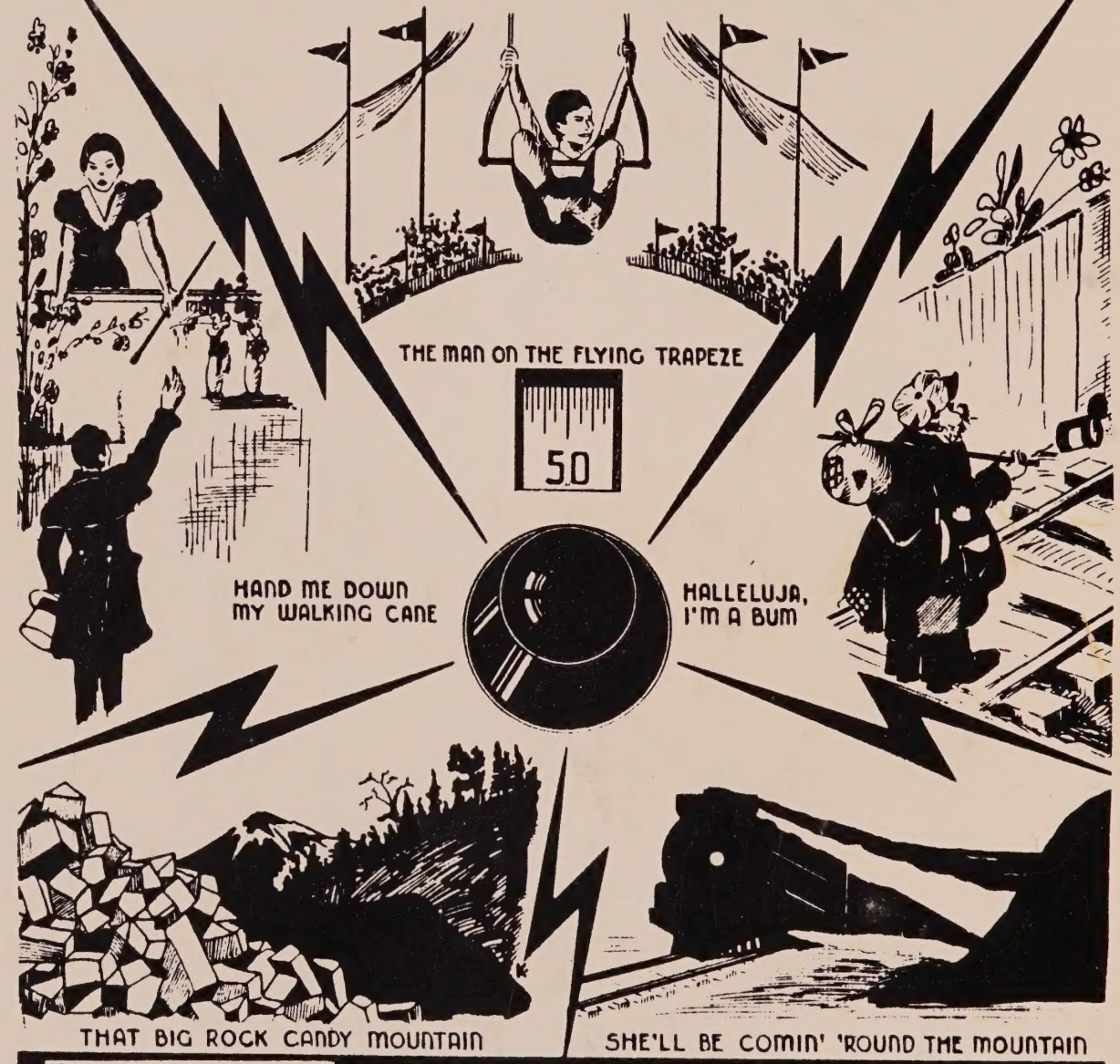
Leonard Fuller, who worked with de Forest in the early days, died on 27 April at the age of 96. He designed Transatlantic radio equipment for the Army and Navy. He also installed the first telephone system on a Navy Ship. During World War One, he was a member of The National Research Council working on anti-submarine warfare. He was professor of Electricial Engineering at the University of California at Berkeley and then became Acting Professor of Elecrrical Engineering at Stanford. He is another pioneer who will be missed.

LIFE'S DARKEST MOMENT



MILLS COLLECTIVE EDITION

FAVORITE RADIO SONGS



MILLS MUSIC INC. Music Publishers 1619 Broadway New York, N.Y.

GATHER 'ROUND THE RADIO, IS EVERYBODY SET?
GIVE THE LITTLE DIAL A TWIST AND LET'S SEE WHAT WE GET

CHRS